



# SPEC<sup>®</sup> CFP2006 Result

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## NEC Corporation

**SPECfp<sup>®</sup>2006 = 109**

Express5800/R120f-1M (Intel Xeon E5-2695 v3)

**SPECfp\_base2006 = 104**

CPU2006 license: 9006

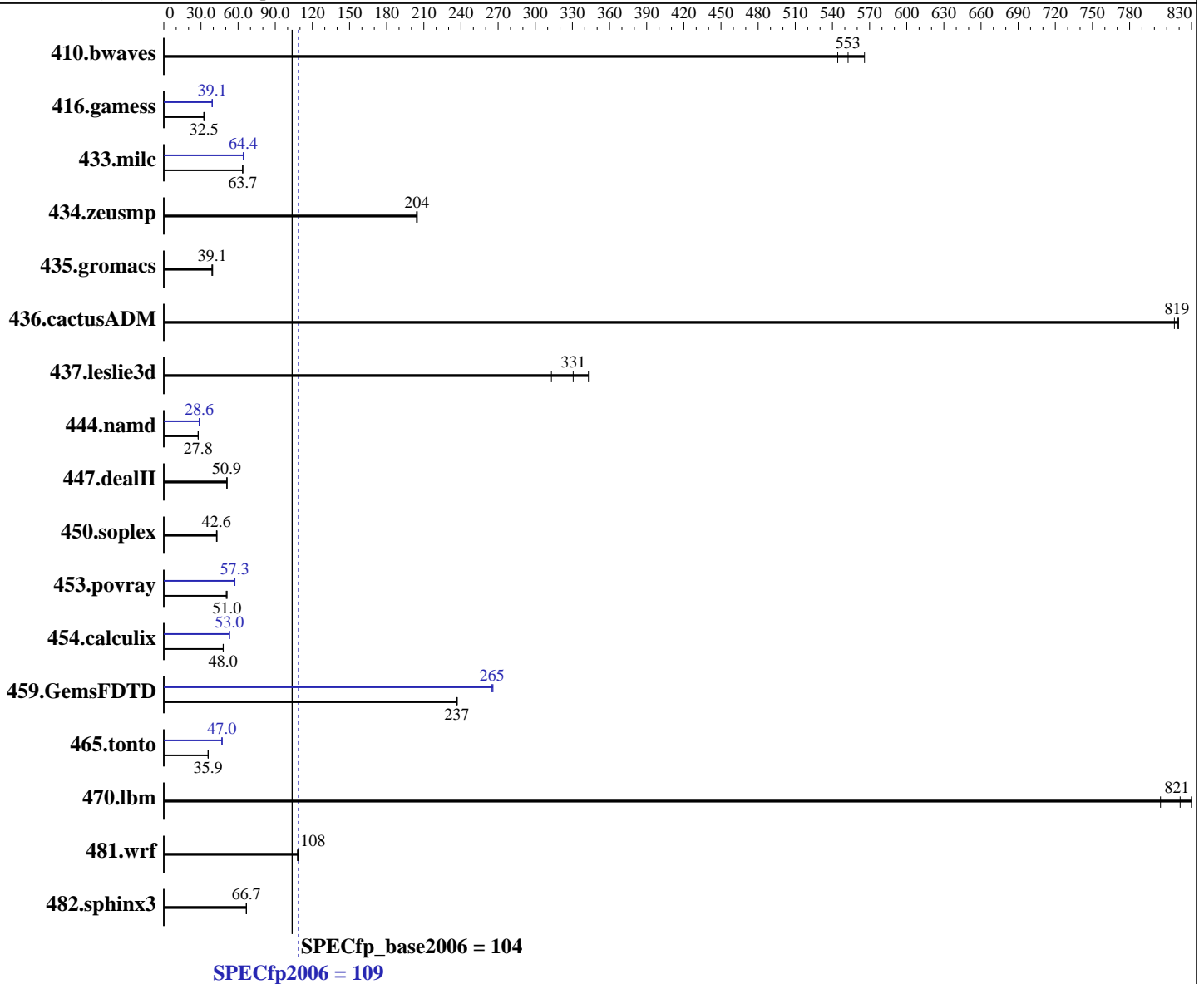
Test date: Dec-2014

Test sponsor: NEC Corporation

Hardware Availability: Feb-2015

Tested by: NEC Corporation

Software Availability: Jul-2014



### Hardware

CPU Name: Intel Xeon E5-2695 v3  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz  
 CPU MHz: 2300  
 FPU: Integrated  
 CPU(s) enabled: 28 cores, 2 chips, 14 cores/chip  
 CPU(s) orderable: 1,2 chips  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 256 KB I+D on chip per core

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### Software

Operating System: Red Hat Enterprise Linux Server release 6.5 (Santiago)  
 Kernel 2.6.32-431.17.1.el6.x86\_64  
 Compiler: C/C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux;  
 Fortran: Version 15.0.0.090 of Intel Fortran Studio XE for Linux  
 Auto Parallel: Yes  
 File System: ext4

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L3 Cache: 35 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2133P-R)  
 Disk Subsystem: 1 x 250 GB SATA, 7200 RPM  
 Other Hardware: None

System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 32/64-bit  
 Other Software: None

## Results Table

| Benchmark     | Base       |             |             |             |             |             | Peak        |             |             |             |             |             |
|---------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|               | Seconds    | Ratio       | Seconds     | Ratio       | Seconds     | Ratio       | Seconds     | Ratio       | Seconds     | Ratio       | Seconds     | Ratio       |
| 410.bwaves    | 25.0       | 544         | 24.0        | 566         | <u>24.6</u> | <u>553</u>  | 25.0        | 544         | 24.0        | 566         | <u>24.6</u> | <u>553</u>  |
| 416.gamess    | 605        | 32.4        | 602         | 32.5        | <u>603</u>  | <u>32.5</u> | 501         | 39.1        | 500         | 39.1        | <u>501</u>  | <u>39.1</u> |
| 433.milc      | <u>144</u> | <u>63.7</u> | 144         | 63.7        | 144         | 63.7        | 143         | 64.1        | <u>143</u>  | <u>64.4</u> | 143         | 64.4        |
| 434.zeusmp    | 44.4       | 205         | <u>44.5</u> | <u>204</u>  | 44.6        | 204         | 44.4        | 205         | <u>44.5</u> | <u>204</u>  | 44.6        | 204         |
| 435.gromacs   | <u>183</u> | <u>39.1</u> | 181         | 39.5        | 184         | 38.9        | <u>183</u>  | <u>39.1</u> | 181         | 39.5        | 184         | 38.9        |
| 436.cactusADM | 14.6       | 816         | 14.6        | 820         | <u>14.6</u> | <u>819</u>  | 14.6        | 816         | 14.6        | 820         | <u>14.6</u> | <u>819</u>  |
| 437.leslie3d  | 27.4       | 343         | <u>28.4</u> | <u>331</u>  | 30.0        | 313         | 27.4        | 343         | <u>28.4</u> | <u>331</u>  | 30.0        | 313         |
| 444.namd      | <u>289</u> | <u>27.8</u> | 288         | 27.8        | 289         | 27.8        | 281         | 28.6        | 281         | 28.5        | <u>281</u>  | <u>28.6</u> |
| 447.dealII    | <u>225</u> | <u>50.9</u> | 225         | 50.9        | 224         | 51.1        | <u>225</u>  | <u>50.9</u> | 225         | 50.9        | 224         | 51.1        |
| 450.soplex    | 194        | 43.0        | 196         | 42.6        | <u>196</u>  | <u>42.6</u> | 194         | 43.0        | 196         | 42.6        | <u>196</u>  | <u>42.6</u> |
| 453.povray    | 104        | 51.0        | <u>104</u>  | <u>51.0</u> | 106         | 50.4        | <u>92.9</u> | <u>57.3</u> | 93.0        | 57.2        | 92.6        | 57.4        |
| 454.calculix  | 172        | 48.0        | <u>172</u>  | <u>48.0</u> | 172         | 48.0        | 156         | 52.9        | 156         | 53.0        | <u>156</u>  | <u>53.0</u> |
| 459.GemsFDTD  | 44.8       | 237         | <u>44.8</u> | <u>237</u>  | 44.8        | 237         | 40.0        | 265         | 39.9        | 266         | <u>40.0</u> | <u>265</u>  |
| 465.tonto     | 274        | 35.9        | 276         | 35.7        | <u>274</u>  | <u>35.9</u> | <u>209</u>  | <u>47.0</u> | 209         | 47.0        | 210         | 47.0        |
| 470.lbm       | 17.1       | 805         | <u>16.7</u> | <u>821</u>  | 16.6        | 830         | 17.1        | 805         | <u>16.7</u> | <u>821</u>  | 16.6        | 830         |
| 481.wrf       | 103        | 109         | 103         | 108         | <u>103</u>  | <u>108</u>  | 103         | 109         | 103         | 108         | <u>103</u>  | <u>108</u>  |
| 482.sphinx3   | <u>292</u> | <u>66.7</u> | 292         | 66.6        | 292         | 66.7        | <u>292</u>  | <u>66.7</u> | 292         | 66.6        | 292         | 66.7        |

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

## Platform Notes

BIOS Settings:  
 Power Management Policy: Custom  
 Energy Performance: Performance  
 Patrol Scrub: Disabled  
 Early Snoop: Disabled  
 Hyper-Threading: Disabled



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## General Notes

Environment variables set by runspec before the start of the run:

KMP\_AFFINITY = "granularity=fine,compact"

LD\_LIBRARY\_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/sh"

OMP\_NUM\_THREADS = "28"

Transparent Huge Pages enabled with:

echo always > /sys/kernel/mm/redhat\_transparent\_hugepage/enabled

## Base Compiler Invocation

C benchmarks:

icc -m64

C++ benchmarks:

icpc -m64

Fortran benchmarks:

ifort -m64

Benchmarks using both Fortran and C:

icc -m64 ifort -m64

## Base Portability Flags

410.bwaves: -DSPEC\_CPU\_LP64  
 416.gamess: -DSPEC\_CPU\_LP64  
 433.milc: -DSPEC\_CPU\_LP64  
 434.zeusmp: -DSPEC\_CPU\_LP64  
 435.gromacs: -DSPEC\_CPU\_LP64 -nofor\_main  
 436.cactusADM: -DSPEC\_CPU\_LP64 -nofor\_main  
 437.leslie3d: -DSPEC\_CPU\_LP64  
 444.namd: -DSPEC\_CPU\_LP64  
 447.dealII: -DSPEC\_CPU\_LP64  
 450.soplex: -DSPEC\_CPU\_LP64  
 453.povray: -DSPEC\_CPU\_LP64  
 454.calculix: -DSPEC\_CPU\_LP64 -nofor\_main  
 459.GemsFDTD: -DSPEC\_CPU\_LP64  
 465.tonto: -DSPEC\_CPU\_LP64  
 470.lbm: -DSPEC\_CPU\_LP64  
 481.wrf: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_CASE\_FLAG -DSPEC\_CPU\_LINUX  
 482.sphinx3: -DSPEC\_CPU\_LP64

## Base Optimization Flags

C benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch  
-ansi-alias

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## Base Optimization Flags (Continued)

C++ benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias

Fortran benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch

Benchmarks using both Fortran and C:

-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch  
-ansi-alias

## Peak Compiler Invocation

C benchmarks:

icc -m64

C++ benchmarks:

icpc -m64

Fortran benchmarks:

ifort -m64

Benchmarks using both Fortran and C:

icc -m64 ifort -m64

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

433.milc: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)  
-auto-ilp32 -ansi-alias

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

C++ benchmarks:

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## Peak Optimization Flags (Continued)

444.namd: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)  
-fno-alias -auto-ilp32

447.dealII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll4  
-ansi-alias

### Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2  
-inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2  
-inline-level=0 -opt-prefetch -parallel

465.tonto: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)  
-inline-calloc -opt-malloc-options=3 -auto -unroll4

### Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias

481.wrf: basepeak = yes

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.html>

<http://www.spec.org/cpu2006/flags/NEC-Platform-Settings-V1.2-120f-RevB.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.xml>

<http://www.spec.org/cpu2006/flags/NEC-Platform-Settings-V1.2-120f-RevB.xml>



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